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Sumac in Food Industry: A Changing Outlook for Consumer and Producer

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ABSTRACT

Rhus coriaria Linn. (Anacardiacea), commonly known as sumac, grows in non-agriculturally regions and its various species may be used for medicinal purposes. This plant is grows mainly in Iran, Afghanistan and the Mediterranean bordering countries. In folk medicine, it was used for treatment of stroke chronic symptoms, diarrhea-dysentery, hemorrhoids, leucorrhea, sore throat, ophthalmic, wound healing, pain and liver disease. Also sumac has protective effect on some risk factors of atherosclerosis and oxidative stress. Results have shown that sumac may be a source of hydrolysable tannin and natural antimicrobial agents making it a usable natural preservative, antioxidant and antimicrobial component in food industry. These biological properties may be attributed to the presence of individual phytochemicals, mainly phenolic compounds. This review presents a changing outlook for consumers and producers regarding the applications of sumac in food formulations.

Keywords: Application; Dietary fiber; Manufacture; Sumac

Introduction

Sumacs are a group of woody-perennial, deciduous, flowering shrubs, belonging to the genus Rhus. They are comprised of roughly 250 individual species, widely distributed throughout the subtropical to temperate regions of the northern hemisphere Sumac's birth certificate showed in Table.1 [1]. In general, sumac can grow in non-agriculturally viable regions and various species have been used by indigenous people for medicinal and other purposes, suggesting potential for commercializing the bioactivity of these plants without competing for food production land uses .Rhus coriaria (Tanner's Sumac or Sicilian Sumac) grows wild mainly in the Mediterranean bordering countries, South Europe, North Africa, Iran and Afghanistan [2].

Table 1: Sumac's birth certificate

Dynasty	plants
Category	Flowering plants
Group	Anacardiaceae
Genus	*Rhus*
specie	coriaria L

The fruits are red colored and contain one seed. It's dried and ground leaves have been used as a tanning agent due to their high tannin content. Free radicals contribute to more than one hundred disorders in humans including atherosclerosis, arthritis, and ischemia and reperfusion injury of many tissues, central nervous system injury, gastritis, cancer and AIDS. These free radicals are the major points in lipid peroxidation. The antioxidants may mediate their effect by directly reacting with Reactive oxygen species (ROS), quenching them and/or chelating the catalytic metal ions. Several synthetic antioxidants, e.g., butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) are commercially available but are quite unsafe and their toxicity is a problem of concern Natural antioxidants, especially phenolics and flavonoids, are safe and also bioactive which are capable of absorb and neutralize free radicals, quenching singlet and triplet oxygen or decomposing peroxides. Recently focus has been concentrated on identification of plants components with antioxidant ability that may be used for human diet [3].

Recent epidemiological studies have strongly suggested that consumption of certain plant materials may reduce the risk of chronic diseases related to oxidative stress on account of their antioxidant activity and promote general health benefits. Today, a large mass of literature indicates that adding sumac into food stuff or water can have beneficial effects on human and animals [4]. Rhus coriaria has been used in spice blends and in traditional medicines for hundreds of years. Sumac beneficial effects on human health was showed in Figure 1. [5-6]. this paper presents a changing outlook for consumers and producers regarding the applications of sumac in food formulations.

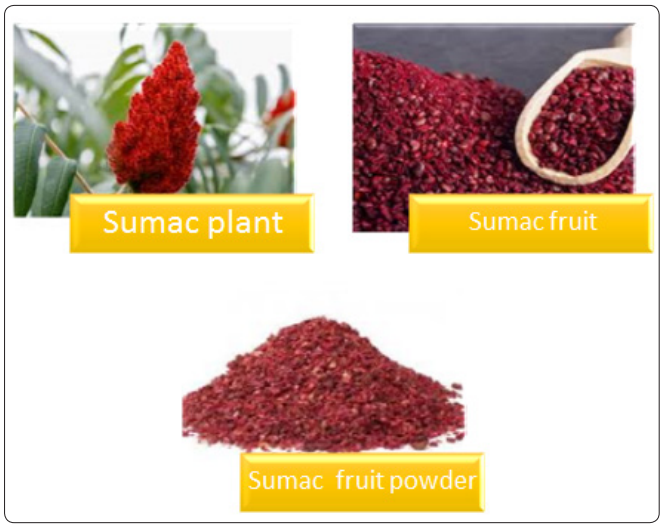

Figure 1: Rhus coriaria Plant and fruits

History

Sumac has been used as a natural and traditional source of medication in different dietary cultures all over the world; the use of the plant in seasonings and flavoring agents has been the mainstay of indigenous remedies across the world [7 8]. Rhus coriariaL. Showed in Figure.2.Sumac is used as a spice, and has been used in cooking for millennia. It is commonly used as a seasoning spice in the Mediterranean region, especially in meat and fish dishes [2].

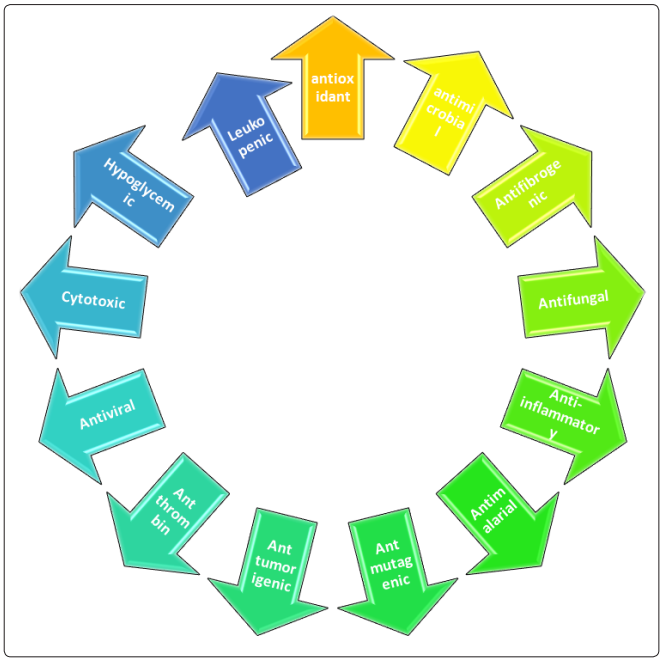

Figure 2: Sumac beneficial effects on human health

Morphological Characterization of Different Parts of the Plant Rhus coriaria L. is a shrub 3-4m high, the leaves pinnate with 6-8 pairs of small oval leaflets of different sizes, and white flowers in terminal inflorescences. The fruits are globose, villose and reddish drupe when ripe; with one seed, they contain tannins, essential oils, various organic acids, anthocyanins and fixed oil. The leaves contain gallic acid, (bi) flavonoid, sugar, wax and essential oils Generally, investigations have focused on the tannin and flavonoid contents of R. coriaria leaves [9].

Phytochemical Significance

Rhus coriaria has long been investigated to expose its chemical composition. R. coriaria plant is known as an abundant source of tannins (condensed and hydrolysable), phenolic acids, anthocyanins, gallic acid derivatives, flavonoid glycosides, organic acids [10]. Tannins are astringent and bitter compounds, which can form strong complexes with various macromolecules that bind to and can precipitate proteins and other organic compound the tannin compounds are widely distributed in many plant species, where they play a role in protection from predation, and plant growth regulation [11]. Structurally, tannins are divided into two classes: hydrolysable and condensed ones. Rhus coriaria has been reported as one of the major commercial hydrolysable tannin sources [12].

Food application of sumac

There is an increasing interest in using plant extracts by the food industry as natural preservatives. Lipid oxidation and microbial growth in food can be controlled by the use of plant extracts. Water extracts of R. coriaria possess a strong antioxidant and antibacterial activity against food-born pathogenic bacteria, suggesting the use of water extracts of the plant as effective and natural preservatives in food manufacturing [13]. The antibacterial activity of R. coriaria was the most effective against bacteria and this could be linked to the chemical constitutes of the plant including the phytochemical components and the rate of these substances in screened extracts, where most of these groups have the antibacterial properties. Plants have formed the natural products make excellent lead for new drug development. The World Health Organization (WHO) is encouraging, promoting and facilitating the effective use of herbal medicine in developing countries for health programs [14].

Some studies claim that the phenolic compounds present in spices and herbs might also play a major role in their antimicrobial effects [15]. R. coriaria contains phenols, tannins, and as in many research explained the action of hydrophobic property of phenolic compounds [16].

[17-19].Waste extracts of R. coriaria are considered a potential source of natural, safe, plentiful, and also a cheap antimicrobial resource for food, acting as a surface decontaminant replacement by the use of the synthetic and chemical antimicrobials in the poultry industry [20-21]. Waste extracts of R. coriaria are considered a potential source of natural, safe, plentiful, and also a cheap antimicrobial resource for food, acting as a surface decontaminant replacement by the use of the synthetic and chemical antimicrobials in the poultry industry. This sumac powder mix can be effectively used in poultry and meat food production chains [22-24].

Health benefits prebiotic dosage of sumac

In folk medicine and traditional Arabic Palestinian herbal medicine, this plant has been used in the treatment of cancer, stroke, diarrhea, hypertension , dysentery, hematemesis, opthalmia, stomach ache, diuresis, diabetes, atherosclerosis , measles, smallpox , liver disease, aconuresis, teeth and gum ailments, headaches, animal bites, dermatitis, and liver disease(5). Furthermore, R. coriaria is known to possess non-mutagenic, fever-reducing, DNA protective, antiseptic, antifungal, antibacterial, antioxidant, anti-ischemic, hypouricemic, hypoglycemic, and hepatoprotective properties, which support its traditional uses [25-26].

Conclusions

In general, sumac can grow in non-agriculturally viable regions and various species have been used by indigenous people for medicinal and other purposes, suggesting potential for commercializing the

bioactivity of these plants without competing for food production land uses. Water extracts of R. coriaria possess a strong antioxidant and antibacterial activity against food-born pathogenic bacteria, suggesting the use of water extracts of the plant as effective and natural preservatives in food manufacturing. So, it is suggested that sumac, as a natural additive, could be used to increase the shelf life of industrial products, providing the consumer with food containing natural additives, which might be seen more healthful than those of synthetic source. However, more studies are needed to evaluate the clinical health effect of sumac on metabolic and food born disease.

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